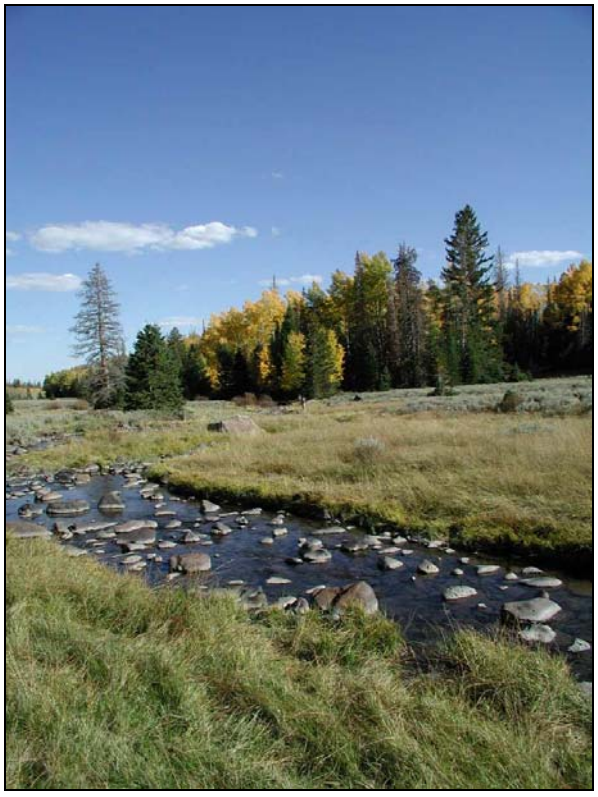
Dixie National Forest

Monitoring Report for Fiscal Year 2005



Introduction

The purpose of this summary is to provide forest managers and the public with a brief look at the monitoring accomplished during fiscal year 2005 as part of implementing the Dixie National Forest Land and Resource Management Plan (forest plan). This report does not discuss individual management projects. Instead, it gives an overview, for fiscal year 2005 and by subject area, of specific monitoring items prescribed in the forest plan. More information is available from the Dixie National Forest, 1789 Wedgewood Lane, Cedar City, Utah 84720.

Air Quality

All prescribed burning was implemented in compliance with the Utah Interagency Smoke Management Program. The forest submitted the annual burn schedule to the Utah interagency smoke management coordinator. Permission to burn was given before each prescribed burn was ignited.

In 2005, fire managers complied with state air-quality standards. Also during that time, the Dixie did not have any violations for significantly contributing to particulate matter. Smoke-monitoring equipment was set up in some areas potentially affected by prescribed-fire activities, and public complaints were monitored by local districts. Complaints were reported to the Utah interagency smoke management coordinator. Public comments reported a smoke level of "low" for all prescribed fires on the forest.

Dispersed Recreation

Dispersed Visitor Use

There was an overall forest-wide decrease in non-motorized trail use and an increase in motorized use. This mimics the national trend on motorized recreation use. The trail-use data was gathered using new, electromagnetic trail counters, which are subject to fewer errors than the old infrared counters. Consequently, the changes in trail counts could be caused by better trail-count data. We will continue using electromagnetic counters.

The forest began monitoring winter dispersed use in the 2004-2005 season. Because this was the first year data was collected, we cannot infer any trends.

The forest intends to continue monitoring to create baseline data. We expect trail use to increase because the forest is close to fast-growing Las Vegas, and because it offers many opportunities for motorized recreation.

The following picture shows an ATV rider enjoying one of the many motorized trails on the Dixie.

Figure 1. *An ATV rider using the Markagunt ATV system on the Cedar City Ranger District*

Trail Conditions

The forest uses the TRACS trail-condition survey protocol to determine the condition of trails. It is the Forest Service Intermountain Region standard. Of the 112 miles of trail inventoried in 2005, most (more than 70 percent) were substandard and in need of improvement. There are insufficient funds to correct these trail deficiencies. The forest will continue to look for opportunities to maintain trails to the regional standards.

Fisheries

Fish and Riparian Habitat

The forest inventoried three streams on the Powell Ranger District in 2005: Cottonwood Creek, Deep Creek, and Deer Creek. All suffered resource damage from the Sanford Fire of 2002; none currently meets forest-plan standards for fish and riparian habitat conditions. However, their trend is progressing toward acceptable conditions, and we expect this to continue. Recovery time from intense wildland fire varies, so the best course of action is to continue to monitor these important habitats annually.

Bonneville Cutthroat Trout

Because of the heavy impacts to Deep Creek, the Sanford Fire (referred to above) also severely degraded Bonneville Cutthroat Trout habitat. This habitat is still in very poor condition, and the stream is currently unable to support a self-sustaining Bonneville cutthroat trout population. Factors contributing to the degraded fisheries habitat quality are (1) high water temperatures, (2) lack of over-stream shade and cover, (3) poor pool habitat, (4) lack of spawning habitat, (5) lack of overwintering habitat, and (6) poor aquatic macro-invertebrate community composition.

Resident Trout

The fish population data collected in 2005 is difficult to compare with the guidance in the forest plan. This is because until 2003, data was collected by the Utah Division of Wildlife Resources, who determined where the sampling would take place. Since then, forest personnel have collected the data. The photo below shows an area of Deep Creek.

Figure 2. *A section of Deep Creek, showing the results of the Sanford Fire*

Protection—Fire

Adequacy of Fire-prevention Programs

We measure the adequacy of our prevention programs by the number of human-caused fires. As the chart below shows, there were ten human-caused fires with a total of 167 acres burned in 2005.

	Lightning Caused	Human Caused	Wildland Fire Use	Total
Fires	55	10	-	65
Acres	15,638	167	20	15,825

Figure 3. *Number of human-caused and lightning-caused fires, and total acres burned*

Number of Wildfires and Acres Burned

In 2005, a total of 15,805 acres were burned, excluding fire for resource benefit. These fires were successfully suppressed. The chart above shows totals for all fires on the Dixie.

There were 65 wildfires on the forest in 2005, and much of the acreage was on the Pine Valley Ranger District (over 98%). The largest fire was Blue Springs; it was located on the Pine Valley district, Cedar City BLM, and private land.

Fire-management Effectiveness Index

We no longer use this method of reporting because it does not adequately measure success of the fire program.

Compliance with Fuel-loading Standards

The Dixie used prescribed burns to reduce fuel loading. However, field measurements on at least 30% of the projects (a requirement of the forest plan) have not been consistently reported. In 2005 the forest treated 8,703 acres using mechanical and prescribed-fire treatments. This is up from 7,437 acres in 2004.

Protection—Insects and Diseases

Bark Beetles

Insects and disease have increased over the past ten years overall. This has prompted more dead spruce salvage and delayed other treatment activities.

The pine bark beetle, along with limb rust and mistletoe, is slowly killing the over-mature ponderosa pine on the forest.

Localized mountain and western pine-beetle buildups have been observed over the years. The sustained drought conditions create greater moisture stress and stand susceptibility, particularly in older trees.

The spruce bark-beetle population grew to epidemic levels on the Cedar City district in the early 1990s. By 2005, the Engelmann spruce component on that district had been altered from an over-mature stand structure to total replacement in some areas. In other areas, small seedlings and saplings predominate. Over the next century the spruce-dominated landscape will re-vegetate to aspen.

A similar process has been happening on the Powell district. Here, too, the mature and over-mature spruce stands have been replaced with aspen and subalpine fir because of the Engelmann spruce mortality.

The Escalante and Teasdale districts also experienced spruce-beetle epidemics in the early 2000s, killing mature spruce trees. The forest continues to salvage dead materials on all districts, although some projects have been delayed by litigation.

Recently the Douglas-fir bark beetle and fir engraver beetle populations have been building and killing large areas of Douglas-fir and white fir trees. The pinyon ips beetle population has reached epidemic levels in some areas in the pinyon-juniper type and has killed large areas of pinyon pine.

Pictured below is a stand of ponderosa pine that has been thinned to reduce fire hazard, allow more light, and increase stand vigor.

Figure 4. *The Dixie National Forest has thinned this stand of ponderosa pine to promote forest health.*

Root Rot and Limb Rust

Root rot continues to be widespread. A research and treatment program was initiated on the Teasdale district, and localized treatments have been prescribed in timber-sale projects. Results are pending.

Timber-sale prescriptions and cultural treatment activities appear to have reduced the incidence of limb rust in ponderosa pine.

Range

Upland Vegetation and Trend

During 2003-2005, 205 long-term trend monitoring studies were completed. Fifty of these monitoring studies were level III riparian inventories; 100 were upland range trend monitoring studies completed by forest personnel, and 55 were Utah Division of Wildlife Resources (UDWR) big-game range trend studies that were read and analyzed by UDWR in 2003.

Only 15 of the 100 Forest Service upland sites were replicated studies from which trend data can be derived. Eleven of these studies were read in 2004. Fifty of the 55 UDWR upland studies provide trend information—5 of their sites are new baseline data sites. Trends for these UDWR studies were simply recorded as UDWR has reported them, without interpretation.

Of these 65 replicated upland studies, the raw data on 52 (80%) indicates a downward trend either in vegetation condition, ground cover, or both. However, neither a general trend for forest range conditions nor a

determination in a need for a change in management direction can be determined from this data. The following factors must be taken into account:

1. The 15 Forest Service sites are mostly located on the Pine Valley Ranger District because these sites were established or read in 1989 using current methodology, making them repeatable.

2. The 50 UDWR sites are all located on big-game winter range along the drier, lower elevation perimeter of the forest in pinyon-juniper, sagebrush, or browse types—many in reseeded or vegetation type conversion.

3. UDWR determines the amount of bare soil by measuring aerial ground cover rather than basal ground cover.

4. All of the UDWR studies were read in 2003 at the height of the long-term severe drought.

5. Eleven of the 14 Forest Service studies were read in 2004, at the height of the long-term severe drought.

Based on this evaluation of data, no permanent changes in management direction are proposed. During the several years of drought, which climaxed (and maybe ended) in 2004, observations and evaluations of variations in vegetation and soil conditions were constant and prompted annual short-term changes in management. Livestock numbers were significantly reduced across the forest. Entry dates were delayed, and many operators were required to remove livestock before season's end.

In 1986, the forest plan did not define vegetation and soil (ground cover) conditions that would serve as a baseline from which to measure. Therefore, there are no reference conditions (from 1986) from which to measure trend. Since there is no baseline, sole reliance is placed on measuring trend during a defined time frame, from one long-term trend study reading to another. Therefore, variation that would cause further evaluation may be appropriate. Of the 100 upland studies reported here, only 15 had previously established baseline studies using current methodologies. Other study sites have previous readings, but data was collected using various methods which are not compatible with current measurements. In the absence of periodically recorded post-1986 data, we cannot project a clear picture of how much the range has improved (or not improved) over 1986 levels.

The forest has established a long-term monitoring program, as indicated by the number of studies re-read or established in the past two years. Over time, these studies will be repeated and valid trend data will become

available. This data is stored in a retrievable database where it can be accessed and additional repeat studies can also be stored and compared.

Riparian Ecosystems

The forest plan (standard and guideline 4B) requires the forest to "maintain at least 70 percent of the linear distance of all riparian ecosystems in at least an upper mid-seral successional stage." In a sample of 50 riparian areas across the forest, 64% are approaching or in a mid- or upper- (late or PNC – potential natural community) successional stage; 36% are in a very early or early successional stage. Although the rating is close to the standard, it appears that the minimum 70 percent was attained in only 64 percent of the sample. This may be variation that would cause further evaluation or change in management direction. Concentrated livestock use in riparian areas during the extended drought and readings measured during the drought should be considered in determining the need for long-term change in management. Effective permit administration, implementation and enforcement of allowable forage use guidelines, and compliance monitoring will continue to be emphasized.

Stream bank stability: Forest plan standards and guidelines for bank stability (4A) and wildlife and fish (6B) require that we "maintain 50 percent or more of total stream bank length in stable condition". In a sample of eight sites of the East Fork of the Sevier River drainage, all sites had a moderate, good, or excellent bank stability rating. These sites are meeting forest-plan specifications.

Forage Use

Allotments, as a whole, appear to have been kept within allowable use levels in 2005. However, some isolated riparian areas did not have sufficient stubble height remaining at the end of the growing season. They exceeded use standards by more that 20 percent. Precipitation was approximately 200 percent of normal, and forage production was very high as a result. Because of heavy snowpack extending late and into spring turn-on dates, several allotments were delayed entry by permitted livestock. In addition, a number of permittees had not restocked to permitted levels following drought-induced reductions. Therefore, forest-wide actual use in 2005 was below permitted use and in some cases, below authorized use. Overall forage use was within prescribed use levels. If cooperative management and effective forage use can be maintained, it is likely that the trend will continue to move in a favorable direction.

The picture below shows forest employees monitoring the condition of vegetation in a range upland area.

Figure 5. *Dixie NF seasonal employees gather data for an upland vegetation trend study.*

Soils

Soil and Water Resource Improvement Needs Inventory

Forest hydrologists have begun to update the forest-wide watershed improvement needs inventory, and entering the information into a data base. This data will be used to plan watershed improvement projects. The hydrologists will continue to coordinate with district resource specialists on watershed improvement projects by clearly defining objectives and developing plans well in advance of implementation. The forest is using the database to document watershed improvements, and integrating them into the five-year vegetation management plan. We currently have more demand for watershed projects than our budget can support.

Soil-survey Activities

Collection of data for the forest-wide field soil inventory has been completed (as directed in the forest plan, page II-52). Therefore, no soil-survey activities occurred in 2005. This is because we do not collect soil-survey data at a landscape scale—only on project-level work.

Long-term Soil Productivity

Two former prescribed-fire sites were monitored, using accepted methods—fabric dams, erosion pins, visual estimates, photo points, and others. We found that the monitored sites were within guidelines for soil-loss tolerance. Vegetative recovery on these sites, together with effective ground cover, has

stabilized them. Soils do erode after fires, but appear to be stabilizing to within soil tolerance levels within three years.

Compaction

We monitored compaction on two timber sales in 2005. It confirmed that compaction occurs during skidding (dragging the logs away from the harvest site). On average, 1.2 percent of the timber-sale units had experienced a 15 percent increase in bulk soil density. This was well within the soil-quality guidelines established by the Forest Service Intermountain Region. Timber harvests do cause compaction. But with proper use of soil and water conservation practices and a well-designed and managed trail network, compaction is within acceptable levels.

Soil and Water Resource Protection—Project EA Mitigating Requirements

Review of one project revealed a need for monitoring during implementation, to prevent impacts to riparian resource areas. Although the size of the disturbance was minimal, future similar projects need to address design concerns during project planning.

The photo below shows employees gathering data on a riparian area.

Figure 6. *Seasonal employees collect riparian vegetation data on Little Pinto Creek, north of Old Iron Town.*

Upland Areas Adjacent to Riparian Management Areas

One monitoring project tested whether logs placed in head cuts of a stream helped prevent sediment from moving off site. We found that although there

were problems with a collapsing stream face, the logs may help stabilize the channel in the future.

Another site we monitored showed that our plans were on the right track—to re-locate a campground and picnic area to prevent further flood damage, and to establish a buffer zone between the campground and stream. This, in turn, will move the area closer to the standard and guideline in the forest plan: to have a minimum up-slope buffer adjacent to a riparian management zone. The forest is improving management techniques for uses near riparian areas.

Timber

Timber Harvest Area

The projected average of acres of timber harvest, according to the forest plan, is 10,525 acres per year. The actual number of acres harvested, on average, was 3,501 per year from 1987 to 2005. Therefore, outputs and impacts from timber harvest are less than projected in the forest plan.

Suitable and Unsuitable Land Classifications

The table below shows the number of timber sales and acres verified for timber suitability, from 1987 to 2005.

District	Number of Sales	Total Acres Verified
Cedar City	34	119,809
Escalante	16	95,173
Powell	5	27,992
Teasdale	14	25,505
TOTAL	56	268,479

Figure 7. *Number of timber sales and acres verified for timber suitability from 1987 to 2005*

The forest plan identified 300,100 acres of land suitable for timber, which is greater than the total of 268,479 (above). However, an accurate comparison is not possible until we complete the classification program, which is still underway.

Harvest Practices in Retention / Partial Retention

Mitigation measures to reduce impacts on the visual landscape were minimal for most silvicultural prescriptions. The forest landscape architect, sale-preparation and marking crews, and sale administrator implemented some of the mitigations. Overall, visual quality standards in the landscape management report are being carried through the sale implementation

process and accomplished on the ground. However, there is a need for more consistent post-sale monitoring; either it is not occurring or it is not being documented.

Harvest Practices in Riparian Areas

Riparian areas, ranging from isolated springs to streams and ponds, were present on 28 of the timber sales we reviewed. Hydrologists' recommendations were tracked through the environmental documents, silvicultural prescriptions, marking guidelines, and sale-area maps. A review of silvicultural prescriptions suggests that existing timber-sale contract provisions, when fully implemented with a map, adequately protect and maintain riparian areas in their existing conditions. We did not observe any riparian-area damage.

Adequate Restocking

Most areas that were harvested through a final harvest treatment prior to the adoption of the forest plan, have regenerated to an adequate restocking level. Most of the acres planted since 1990 have been associated with the Engelmann spruce bark-beetle epidemic, which has destroyed most of the spruce on the forest. We expect this work to continue for the next decade.

Drought has affected survival of young trees; however, the use of containerized seedlings has improved seedling survival, especially on basaltic soils.

Pictured below are seedlings at the Lucky Peak nursery.

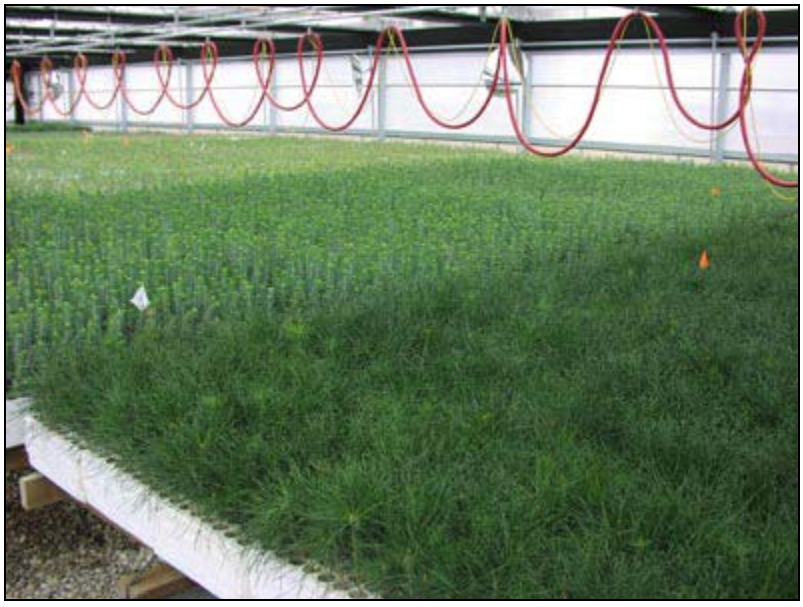


Figure 8. *Engelmann spruce (l) and ponderosa pine (r) seedlings await transplanting.*

Reforestation and Timber-stand Improvement (TSI) Accomplishment

Thinning and reforestation accomplishments to date have not met the projections of the forest plan. It projected 5,000 acres per year in thinning and 1,588 in reforestation. This is due to the decline in the timber harvest program and the accomplishment of most thinning needs early in the monitoring period.

Fuelwood Consumption and Supply

Vegetative management practices on the forest make available an estimated 14,000 cords of fuelwood each year. During the first five years the forest plan was in effect, an average of 7,446 cords of fuelwood was used each year. But after natural gas was delivered to the major population centers in the area, fuelwood use declined to approximately 5,000 cords per year. In the past ten years, the forest has experienced extensive Engelmann spruce tree mortality from a bark-beetle epidemic. This has resulted in thousands of acres of dead trees and heavy concentrations of fuel-loading. Consequently, there has been an increase in fuelwood availability.

Growth Responses

A random sample of 581 trees measured in the 1990 forest inventory showed a diameter growth of 0.7 inches per 10 years in natural stands. Post-harvest growth studies conducted in managed stands in 1991 showed a diameter growth of 1.6 inches per 10 years. This suggests that growth response to managed timber stands is positive.

Timber Supply Projections

The latest forest inventory (1998) showed the following results regarding sawtimber on non-reserved timber lands (lands not specifically designated for timber harvest):

- Net volume is 3,534,863 MBF (thousand board-feet).
- Net annual growth is 45,134 MBF.
- Annual mortality is 43,763 MBF.

The photo below shows a winter timber harvest on the Cedar City Ranger District.

Figure 9. *Harvesting beetle-killed spruce reduces the likelihood of severe wildfire and provides economic benefit to local communities.*

Water

Accomplishment of Riparian-area Management Goals

Two methods of monitoring were used: (1) successional status and bank stability; and (2) properly functioning condition ratings.

Using successional status and bank stability, we monitored 50 riparian sites across the forest. Sixty-four percent are approaching or in a mid- or upper-successional stage; thirty-six percent are in a very early or early successional stage. Since the forest plan specifies a 70 percent minimum in upper mid-seral successional stage, this guideline has not been met.

Using properly functioning condition ratings, we monitored six locations. Five rated as exhibiting all indicators of functionality; one as functional but at risk. Heavy flows from above-average precipitation may have been a factor in the unacceptable condition. Properly functioning condition, successional status, and bank stability are improving. However, the forest guideline from mid-seral successional appears to be unattainable. This will be re-evaluated during forest plan revision.

Compliance with State Water-quality Standards

The forest monitored water quality on three sites. Approximately 72 percent of our samples exceeded the state phosphorus criteria, approximately 10 percent exceeded the state pH criteria, and approximately 13 percent

exceeded the state dissolved oxygen (percent saturation) criteria. One hundred percent of our samples for all other parameters were in compliance with state standards.

We have not yet been able to clearly correlate parameters that were exceeded, with potential causes. Two possible contributing factors are not having enough samples throughout the year, and faulty field equipment.

Native geology (i.e., phosphorous-containing rock) may be contributing to repeated failure to attain phosphorus standards. This would be an example of a natural source not manageable with forest practices. Despite this, the streams on the forest meet state water-quality standards.

Water-yield Increases in East Fork of Sevier Watershed

We dropped this monitoring item because we do not intend to increase the spring discharge of the Sevier River. Instead, we plan to improve and maintain the channel, floodplain, and sponge-filter system of the watershed to maintain a dynamic equilibrium.

Stability of Stream Banks in East Fork of Sevier River Drainages

The Dixie monitored eight sites for bank stability. All eight have moderate, good, or excellent bank-stability ratings. Therefore, these sites meet forest plan guidelines.

Effectiveness and Maintenance Needs of Watershed Improvements

Thirteen watershed improvements were monitored in 2005. These improvements are inspected visually the first year after installation, and every five years after that. Improvement types were varied—head-cut restoration, fence, exclosure, channel restoration, etc. Results of the projects were mixed, with the majority of the projects functioning as designed. Approximately 75 percent of the watershed improvement projects are effective in correcting the identified watershed concern.

Effectiveness of BMPs (best management practices) in Meeting Water-quality Objectives and Goals

This monitoring item was accomplished by inspecting drainage and erosion-control measures on ground-disturbing activities. We found the following: (1) Use of the Dixie harrow for vegetation modification does not detrimentally disturb the soil profile significantly, and (2) Late-spring and early-summer controlled burns leave behind enough debris to dissipate rain-drop impact and form small litter-debris dams during summer thunderstorms. BMPs are therefore effective in meeting water-quality goals and objectives.

Wild Horse Numbers and Habitat Trends

The Dixie counted 101 wild horses on the Pine Valley Ranger District in February, 2006, prior to the annual increase from new foals in 2006. This was therefore the population of the wild-horse territory in 2005. The appropriate management level for this area is 40 to 60 horses. Projected annual increase of this herd is 20 percent; a gather is planned during 2007 to bring population numbers back to 50 horses. The Forest Service coordinates monitoring, removal, and adoption with the BLM (Bureau of Land Management).

Wild horse numbers have impacted vegetation. Some riparian areas did not have sufficient stubble height remaining at the end of the growing season, and exceeded use standards by more than 20 percent. This was despite high forage production due to abundant moisture.

We plan to remove the excess horses in 2007, to bring the numbers down to the appropriate management level prescribed in the 1977 North Hills Wild Horse and Burro Territory Plan.

The following photos show a wild horse on forest land, and a roundup of wild horses in a Forest Service corral.

Figure 10. *A wild horse grazes near Enterprise.*

Figure 11. *The Forest Service has gathered wild horses in a corral about 21 miles west of Enterprise, in an effort to keep their numbers in check and minimize resource damage.*

Wildlife

Management Indicators

Common Flicker: A total of 211 flickers were detected in 2005. This is a decrease from 2004 numbers (329). The same transects (sampling areas) were surveyed both years, at about the same time of year. Spring and summer of 2005 were unusually wet, so the reduction of flicker numbers could have been due to the wet weather conditions that prevailed during survey activities.

Although numbers were down in 2005, there are adequate methods of protecting this species' habitat. Protective measures in the forest plan regarding snags and downed, wood debris are implemented forest wide. These measures are effective in managing and protecting flicker habitat.

Northern Goshawk: In 2005, 39 territories were considered occupied (birds located in the territory, but nesting was not confirmed). A total of 36 were confirmed active (either birds being observed incubating, or young at the nest). These totals are similar to 2004 findings—43 occupied nests and 34 active nests.

Goshawk numbers have been high, with approximately 40 active territories across the forest over the past two years. The production of young recruited into the population in 2005 has increased from 2004. This increase is likely

due to the high level of precipitation in the 2004-2005 season, and the corresponding increase in available prey. The increase in active territories in 2004 and 2005 has corresponded to increased precipitation in southern Utah. We will continue to monitor this closely.

The following picture shows a goshawk nest near Pole Creek.

Figure 12. *A goshawk nest in an aspen tree near Pole Creek*

Project Implementation Reviews

Summary

The forest conducted project implementation reviews on two districts during fiscal year 2005 as part of a regional initiative to improve performance accountability. This is in accordance with Forest Service Manual, section 1420. The types of projects reviewed were fuel treatments, motorized access management, and vegetation management. A forest review team met with district personnel to review completed NEPA documents (e.g., environmental assessments) and other project documentation, followed by a visit to the project site. The reviews help us evaluate project implementation actions to enhance our learning and identify forest improvement needs.

Vegetation projects

The main activities reviewed were prescribed burning, vegetation treatments, tree planting, wildlife habitat enhancement, and travel management. We reviewed NEPA documents, roads-analysis process reports, burn plans, burn monitoring reports, mitigations, and silvicultural prescriptions.

Access-management projects

The main activities reviewed were route designations, re-routes, and closures. The documents we reviewed were NEPA documents, mitigation plans, and roads-analysis process reports.

Forest-wide Implications

We need a process to identify the status of project implementation activities. Is the work done? If not, what is left to do? Have district or forest priorities changed to where continued work on this project has to compete with work on other projects? We also need to develop a forest-wide signing format, and determine whether design considerations of motorized trails could help with law enforcement.